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#### Published:

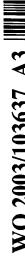
with international search report

(88) Date of publication of the international search report: 13 May 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MODIFIED RELEASE, MULTIPLE UNIT DRUG DELIVERY SYSTEMS

(57) Abstract: The invention relates to novel modified release multiple unit systems, and methods of preparing these systems, which can be easily compressed into tablets or filled into capsules or sachets without affecting the desired release characteristics of the pharmaceutical active ingredients incorporated within the systems. The multiple unit tablet includes multiple units. Each unit includes at least one core having an outer surface, a first coating layer surrounding at least a portion of the outer surface of the core and having an outer surface, one or more rate controlling polymers, and one or more one active pharmaceutical ingredients. The coating layer includes one or both of the one or more active pharmaceutical ingredients and the one or more rate controlling polymers. The tablet may further include an outer layer on the outer surface of the unit which includes a material that is one or both of elastic and compressible. The material may be a wax materials, such as polyethylene glycol's (PEGS).



A. CLASSIFICATION OF SUBJECT MATTER IPC 7 A61K9/24 A61K9/26

A61K31/137

A61K9/28

A61K9/52

A61K31/4965

According to International Patent Classification (IPC) or to both national classification and IPC

#### B. FIELDS SEARCHED

 $\begin{tabular}{ll} Minimum documentation searched (classification system followed by classification symbols) \\ IPC 7 & A61K \end{tabular}$ 

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, EMBASE, BIOSIS, MEDLINE

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
X	WO 99/12524 A (NYCOMED DANMARK A S;BERTELSEN POUL (DK); SKINHOEJ ANNETTE (DK)) 18 March 1999 (1999-03-18)	1-9,12, 29-35, 37-39, 68-70, 73,76,77	
	example 1		
	claim 51		
	page 33, line 31 - line 35		
X	US 4 713 248 A (KJORNAES KIM ET AL) 15 December 1987 (1987-12-15) cited in the application	1-4,6-9, 12,37, 38,68,	
	examples 2,7 abstract	69,73,76	

X Further documents are listed in the continuation of box C.	χ Patent family members are listed in annex.			
<ul> <li>Special categories of cited documents:</li> <li>"A" document defining the general state of the art which is not considered to be of particular relevance</li> <li>"E" earlier document but published on or after the international filing date</li> <li>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</li> <li>"O" document referring to an oral disclosure, use, exhibition or other means</li> <li>"P" document published prior to the international filing date but later than the priority date claimed</li> </ul>	<ul> <li>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</li> <li>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken atone</li> <li>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</li> <li>"&amp;" document member of the same patent family</li> </ul>			
Date of the actual completion of the international search  9 September 2003	Date of mailing of the international search report  2 2 01. 2004			
Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentlaan 2  NL - 2280 HV Rijswijk  Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  Fax: (+31-70) 340-3016	Authorized officer Sindel, U			

# INTERNATIONAL ARCH REPORT

PCT/IB

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	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Х	US 5 783 215 A (ARWIDSSON HANS ET AL) 21 July 1998 (1998-07-21) cited in the application	1,4-6,9, 13,14, 29,30, 32,33, 37,38, 68,69, 73,76
	examples 1,5	
X,P	WO 03/041692 A (KARMA PHARM LTD ;SELA YORAM (IL)) 22 May 2003 (2003-05-22)	1,4-11, 13,14, 29,30, 32,73, 108
	examples 1-4 claims 1,6	
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Box I	Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)
This Inte	ernational Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:
1. X	Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
	Although claims 73-77 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the composition.
2. X	Claims Nos.: 1, 41 (part.), 68, 73 (part.), 82 because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
	see FURTHER INFORMATION sheet PCT/ISA/210
3.	Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).
Box II	Observations where unity of invention is lacking (Continuation of item 2 of first sheet)
This Inte	ernational Searching Authority found multiple inventions in this international application, as follows:
	see additional sheet
1.	As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.	As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.	As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. X	No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  1-14, 18-40, 41-67 (part), 68-72, 73-77 (part), 101-103, 108-109, 114-117
Remarl	The additional search fees were accompanied by the applicant's protest.  No protest accompanied the payment of additional search fees.

### FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1, 41 (part.), 68, 73 (part.), 82

Present claims 1, 41 (part.), 68, 73 (part.) and 82 relate to an extremely large number of possible compounds and products. Support within the meaning of Article 6 PCT and disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds and products claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the formulations mentioned in the examples.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

### FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-14, 18-40, 41-67 (part.), 68-72, 73-77 (part.), 101-103, 108-109, 114-117

Multiple unit dosage form, each unit comprising at least one core, a first coating layer and an outer layer

2. claims: 15-17, 41-67 (part.), 73-77 (part.), 104-107, 110-113

Multiple unit dosage form, each unit comprising at least one core, a first coating layer, one or more additional layers and an outer layer

3. claims: 78-81, 85-100

Multiple unit dosage form, each unit comprising at least one core and a coating layer

4. claims: 82-84

Combination drug comprising two different multiple unit dosage forms

INTERNA	INTERNATIONAL ARCH REPORT				PCT/IB 2186	
Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9912524	A	18-03-1999	AT AU CA CN DE WO EA EP JP NO US	25289 906299 230188 127755 6981935 991252 280 101737 200151585 2000129 659952	8 A 3 A1 0 T 1 D1 4 A1 6 B1 0 A1 4 T	15-11-2003 29-03-1999 18-03-1999 20-12-2000 04-12-2003 18-03-1999 31-10-2002 12-07-2000 25-09-2001 28-04-2000 29-07-2003
US 4713248	A	15-12-1987	AU AU AU CA DDE DDE DDE WO EP FIK HE JDP NO US	46268 850343 850343 015310 015310 85393 100020 100155 5979 705949 705950 6150115	55 A 52 B2 53 A1 50 D1 50 T2 54 T2 55 A1 56 A1 57 A2 58 A1 57 A1 57 B1 57	17-03-1988 27-08-1985 14-04-1988 27-08-1985 03-01-1989 20-12-1988 15-10-1992 18-02-1993 27-05-1993 09-09-1993 09-10-1985 15-08-1985 15-08-1985 28-08-1985 28-08-1985 09-10-1985 09-10-1985 06-02-1998 26-06-1998 09-02-1994 06-04-1994 28-06-1995 12-06-1986 14-11-1985 29-12-1987
US 5783215	A	21-07-1998	AU BR CN CZ EP FIU JP NO NZ PU SK TR	072343 96105 7577 11444 950273 96083 28994 31338 214182 960162	25 A 26 A 26 A 31 A 33 B 34 A 36 A 37 A 38 T 37 A 36 A 37 A 36 A 37 A 36 A 37 A 36 A 37 A 36 A 37 A	14-01-1999 09-02-1996 14-10-1997 25-01-1996 23-10-1996 14-08-1996 15-08-2000 31-07-1996 06-05-1996 28-05-1997 22-09-1999 18-03-1997 29-02-1996 28-07-1998 24-06-1996 27-11-1999 25-01-1996 10-09-1997 21-06-1996

PCT/IB 2186

	Patent document cited in search report		Publication date		Patent family member(s)	Publication date
,	US 5783215	A		TW ZA	460300 B 9505545 A	21-10-2001 08-01-1996
	WO 03041692	Α	22-05-2003	WO	03041692 A1	22-05-2003